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INSTRUCTIONS

FOR

FIELD WORK OF THE MECHANICAL AND ELECTRICAL SECTIONS

DIVISION OF VALUATION
INTERSTATE COMMERCE COMMISSION

INSTRUCTIONS

FOR

FIELD WORK OF THE MECHANICAL AND ELECTRICAL SECTIONS

OF THE

DIVISION OF VALUATION

U.S. INTERSTATE COMMERCE COMMISSION

WASHINGTON
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MECHANICAL AND ELECTRICAL SECTIONS.

INSTRUCTIONS FOR FIELD WORK.

I. INTENT.

1. Purpose of Instructions.

These instructions are intended to describe the field work to be done by the mechanical and electrical sections of the Division of Valuation of the Interstate Commerce Commission under the valuation act of March 1, 1913, and to set forth specifically the information to be ascertained and recorded.

II. ORGANIZATION.

2. Separation of Mechanical and Electrical Sections.

Where the amount and character of electrical property to be valued requires a separate electrical section it may be established, but otherwise the work of inventorying electrical property will, in general, be performed by the mechanical section.

3. Senior Mechanical Engineer.

The senior mechanical engineer in each district shall be responsible, through the district engineer, to the member of the engineering board in charge for the work of the mechanical section.

4. Mechanical Parties.

The field work of the mechanical section shall generally be divided among three groups of parties—motive power, car equipment, and machinery. Each party will generally be composed of one man.

5. Senior Electrical Engineer.

The senior electrical engineer shall be responsible, through the district engineer, to the member of the engineering board in charge for the work of the electrical section.

6. Electrical Parties.

The field work of the electrical section shall be carried on by field parties, each consisting generally of one man.

III. DUTIES OF PERSONNEL.

7. Senior Mechanical Engineer.

Before the mechanical parties begin work on the property of any carrier the senior mechanical engineer shall make a general investigation and study of the property to be inspected; shall confer with the representatives of the carrier in regard to methods of inventory; and shall give such advice as may be required to assist the carrier in complying with the provisions of Valuation Orders Nos. 8 and 13, relating to the preparation of registers or schedules of property with which he is concerned.

He shall furnish to the mechanical parties the necessary registers of equipment, lists of machinery, plans, and other available information required for proper conduct of the work.

8. Mechanical Parties.

The motive-power group shall generally inventory steam locomotives.

The car-equipment group shall generally inventory freight-train cars, passenger-train cars, and work equipment.

The machinery group shall generally inventory roadway machines, shop machinery, floating equipment, and miscellaneous equipment.

The work of all members of the mechanical parties is at all times under the immediate direction of the senior mechanical engineer, who may, when he deems it desirable and upon approval of the member of the engineering board in charge, assign the work other than as above outlined.

9. Senior Electrical Engineer.

Before the electrical parties begin work on the property of any carrier the senior electrical engineer shall make a general investigation of the property; shall confer with the representatives of the carrier in regard to methods of inventory; and shall give such advice as may be required to assist the carrier in complying with the provisions of Valuation Orders Nos. 8 and 13, relating to the preparation of registers or schedules of property with which he is concerned.

He shall furnish to the electrical parties the necessary registers of equipment, lists of machinery, plans, and other available information required for proper conduct of the work.

10. Electrical Parties.

All members of electrical parties shall perform the duties assigned to them by the senior electrical engineer.

IV. GENERAL INSTRUCTIONS.

11. Data for Field Parties.

Each mechanical and electrical party shall be provided with the following publications for instruction and guidance:

(*a*) Copy of the valuation act.

(*b*) Copy of instructions to the field parties of each of the other sections.

(*c*) A set of inventory forms for assembling data, covering the accounts with which the party in question is concerned.

(*d*) Copies of the registers or schedules of equipment and other property furnished by the carrier under Valuation Orders Nos. 8 and 13, or such portions thereof or extracts therefrom as may be needed for the work in hand.

12. Registers of Property to be Submitted by the Carrier.

Under the provisions of Valuation Orders Nos. 8 and 13, carriers will submit registers or schedules of property which it is the duty of the mechanical and electrical parties to inventory.

The "special instructions for accounts" hereinafter are intended to indicate not only the duties of the field parties, but also the scope of the information which is to be furnished in the registers or schedules of property submitted by the carrier.

13. Inspection of Property.

Copies of these registers or schedules or data abstracted therefrom relating to the property under inventory will be supplied to field parties of the mechanical and electrical section, and they shall inspect such property for the purpose of verifying the information contained therein, correcting the same and supplying missing data, if necessary, and obtaining any other required information.

14. Additions and Betterments.

In all cases where the carrier has reported additions and betterments the parties will verify them in so far as may be practicable in the field.

15. PROPERTY TO BE INVENTORIED.

The mechanical parties shall in general inventory all property classified under the following road and equipment accounts of the Interstate Commerce Commission:

25. Gas producing plants.
37. Roadway machines.
44. Shop machinery (except electric motors and wiring).
51. Steam locomotives.
53. Freight-train cars.
54. Passenger-train cars.
56. Floating equipment.
57. Work equipment.
58. Miscellaneous equipment.

The electrical parties shall inventory all property classified under the following accounts:

31. Power transmission systems.
33. Power line poles and fixtures.
34. Underground conduits.
46. Power substation apparatus.

The electrical parties shall also inventory all of the property under the following accounts, except in cases where the entire property is mechanical and not electrical, in which cases it shall be inventoried by the mechanical parties.

32. Power distribution systems.
45. Power plant machinery.
52. Other locomotives.
55. Motor equipment of cars.

The electrical parties shall also, under certain circumstances as set forth hereinafter in the section devoted to "special instructions for accounts," inventory certain property classified under the following accounts:

44. Shop machinery (electric motors and wiring only).
53. Freight-train cars.
54. Passenger-train cars.
57. Work equipment.

It will be necessary for the mechanical and electrical parties to inventory a certain amount of property belonging under accounts other than those above enumerated. A partial list of property of this kind which may, under special instructions, be referred to them is given below:

Under account 5. Pumping and ventilating apparatus.
Under account 6. Drawbridge machinery.
Under accounts 16 and 17. Elevators, electric wiring, heating and ventilating plants, etc.
Under account 18. Pumping machinery.
Under account 19. Coal-handling machinery.
Under account 20. Piping, wiring, elevators, cranes, etc.
Under account 21. Elevating machinery.
Under account 22. Merchandise-handling machinery.
Under account 23. Loading and unloading machinery.
Under account 24. Coal-handling machinery.
Under accounts 29 and 30. Piping, wiring, elevators, cranes, etc.
Under account 35. Miscellaneous mechanical and electrical property.
Under account 47. Unapplied machinery and supplies.

16. CONDITION OF PROPERTY.

The mechanical and electrical parties shall make notes on the condition of all property which it is their duty to inventory.

When printed inspection forms provided for the use of the field parties contain spaces for record of condition, these forms shall be followed as indicating the data required. When such forms are not provided, the condition data recorded shall in general conform to the following outline, in so far as the nature of the property and the information permit:

(*a*) Age.

Ascertain, where practicable, year of construction, installation, or purchase of the property, and whether at that date the property was new or second hand. If used prior to its present service, give such facts as may be obtained as to length and nature of service elsewhere. State source of data.

(*b*) Wear and decay.

Record such facts as to wear and decay as may be practicable from field observation.

(*c*) Maintenance.

Record whether maintenance is normal; that is, if the standard of maintenance prevailing is such as to secure the average service life out of the property. If the maintenance is above or below normal, give facts on which conclusion is based. Where extensive or unusual repairs are needed to put property in serviceable condition, note such facts in detail.

(*d*) Probable service life.

Record any local conditions which may operate to shorten or lengthen the service life of the property as compared with average service life of similar property elsewhere. Record any evidence which may be ascertained in the field as to the inadequacy or obsolescence of the property. Where any definite field evidence can be ascertained as to the probable remaining service life of units of property, note shall be made of same.

17. Carrier's Representative.

The carrier will generally place with each mechanical or electrical party a representative who is familar with the property. He will observe in detail the methods used and the records made by the field party, and will assist in identifying and measuring the property and in ascertaining facts bearing on quantity and condition of property.

18. Form of Notes.

All notes of the mechanical and electrical parties shall be made in duplicate on the inspection forms or on the standard loose-leaf notebook sheets prescribed for the purpose, and shall show the property classified by accounts.

The carrier's representative, if present when the original notes were taken, shall be a party to any changes or corrections made in them, when such changes are made in the field. In case of such changes or corrections no erasure shall be made of the original notes, but diagonal lines shall be drawn through the incorrect notes and the corrected notes inserted. Such changes or corrections shall be made in identical form on both original and carbon copies and shall be dated and authenticated by the person making the same.

With each volume of note sheets there shall be a title page which shall show: The name of the owner of the property; the name of the chief of party in charge, the kind of party, the kind of property to which the notes relate; and, in the case of fixed property, the location of the property inspected, and if applicable the valuation section numbers, and the beginning and ending survey station numbers and mileposts.

Cross reference shall be made in the field to any maps, drawings, specifications, or other records which are useful for identification or pricing purposes, and are submitted by the carriers in connection with the property inspected and inventoried.

The note sheets shall be numbered consecutively for each volume. The beginning and ending of each day's work shall be shown by date over the signature of the person making the notes.

19. Disposition of Notes.

The original notes shall be sent to the district office.

When agreement is in effect to give the carrier carbon copies of field notes, the field parties will be so instructed, and as soon as practicable after the field notes are made the carbon copy shall be delivered to the carrier's accredited representative, under the terms of the agreement. Where no agreement exists, the carbon copies shall be sent to the district office.

20. Modification of Instructions.

These instructions shall not be modified except upon written authority of the member of the engineering board in charge.

21. Use of Carrier's Records.

In so far as it is practicable to do so, the carrier's records shall be utilized to reduce the amount of field work required, but actual inspections shall always be made to verify the accuracy of the records and establish the condition of the property.

22. Patterns.

Each carrier will be required to furnish an inventory of its patterns which the mechanical party shall check.

V. SPECIAL INSTRUCTIONS FOR ACCOUNTS.

23. Account 25. Gas Producing Plants.

Gas-producing plants shall be inventoried in accordance with instructions given for power plant machinery under account 45.

24. Account 31. Power Transmission Systems.

The method of inventorying overhead lines and underground cables of power transmission systems shall be as prescribed for similar parts of electric distribution systems coming under account 32.

25. Account 32. Power Distribution Systems.

(*a*) Steam and compressed-air distribution systems.

Steam and compressed-air distribution systems will be inventoried by the mechanical parties. The following data will be required:

Number of feet of each kind and size of pipe, and covering, if any.

Depth below ground, if buried, or if overhead, how supported.

Character and thickness of pavement over pipe, at the time of original installation and at the present time.

Number, kind, and size of valves and expansion joints, and same data for fittings for pipes over 4 inches diameter.

(*b*) Overhead electric distribution systems.

The electrical parties shall inventory pole lines carrying electrical power or lighting wires, and shall generally at the same time identify all wires and attachments carried by the poles. This may sometimes necessitate identifying material classified under the five following accounts:

26. Telegraph and telephone lines.
27. Signals and interlockers.
31. Power transmission systems.
32. Power distributing systems.
33. Power line poles and fixtures.

In addition to the above it is possible that property may be included which should be classified under account 705, Miscellaneous physical property, or account 35, Miscellaneous structures.

Property belonging under accounts 26 and 27 should be recorded only as to number of wires and other attachments, leaving details to be obtained by the parties concerned with those specialties.

Where poles carry wires or attachments of other companies this fact shall be recorded, and generally the number of cross arms or other attachments belonging to such companies should be noted, as also the points of beginning and ending of such joint use of pole line. In all such cases inquiry shall be made as to the existence of joint ownership, and the ascertained facts recorded.

(*c*) Feeder and transmission wires.

Ascertain all wire sizes. The carrier's records should be verified at convenient opportunities. Character of insulation and material of wire shall be recorded.

The electrical party shall compute and enter on their field notes the length of each kind and size of wire, using for this purpose, when available, distances obtained by the roadway parties. Where the wire lines follow a course not measured by the roadway party, and no other accurate data is available, the electrical party shall measure the distances; however, distances given in the carrier's schedule or furnished from other records of the carrier may be accepted upon sufficient verification.

(*d*) Overhead trolley constructions.

Stationary structures for supporting trolley wire, including brackets and overhead bridges, belong under account 33, Power line poles and fixtures. Flexible attachments, such as span wires, catenary cables, guard wires, and the trolly wire belong under account 32. Insulators generally belong under account 32, but strain insulators in guys which support poles belong under account 33, and insulators supporting transmission wires belong under account 31. Strain insulators in pull-offs, span wires, and trolley strain guys belong under account 32.

All materials connected with trolley construction shall be inventoried with particular attention to allocating them to the proper accounts.

(*e*) Overhead lead-covered cables.

When these are for power purposes they shall be inventoried as prescribed below for underground cables. Size, kind, and quantity of messenger wire shall be recorded, and full details of terminal and connection boxes.

(*f*) Track bonding.

Bonds for carrying power current, for both third rail and track rail, come under this account. The carrier's schedule should give all necessary data, which should include type, length, cross section, number per joint, and number of joints in each mile of track, also similar data for cross bonds, supplementary return, special bonding at track switches, etc. This information shall be checked by the electrical party to a sufficient extent to satisfy them of its accuracy, and to form a basis for estimating condition.

(*g*) Third rail.

The roadway parties will record the station and plus of beginning and ending of each third-rail section, and mark the same on the web of the adjacent track rail. All other inventorying of third rail shall be done by the electrical parties.

The following information will be required:

Type of cross section and weight of third rail.

Total length of third rail.

Dimensions and weight of joints and number per mile.

Insulator description and number per mile, with manufacturer and catalogue number if possible.

Details of third-rail protection, if any.

Third rail end inclines, details and number.

Details of third-rail feeder attachments.

(*h*) Underground contact rails.

The electrical parts of underground contact electric railways come under this account, and not under account 4, Underground power tubes. They should be inventoried as prescribed for third rail in the preceding paragraph.

(*i*) Underground cables.

Underground electric cables for power and light purposes shall be inventoried by the electrical field parties, in accordance with the following instructions, care being taken to distinguish between those belonging under account 31, Power transmission systems, and those belonging under account 32, Power distribution systems.

The following information will be required for each cable: Total length in feet, number of splices, details of construction, and purpose for which used. Specifications must be included showing manufacturer, year of manufacture, number of conductors, diameter and number of strands in each conductor, material and thickness of each layer of insulation and cover.

Voltage, frequency, and phase of current transmitted must be given, and original test voltage requirements, if available. Special equipment in manholes, such as connection boxes and asbestos wrappings, must be described as to kind and quantity, with sketches if necessary, and manufacturer's designation, if any.

Cable racks and barriers in manholes come under account 34, Underground conduits.

Subject to proper verification, the carrier's records should be made the basis for the inventory of all this class of property, but sufficient inspection must be done to verify the carrier's inventories and form a basis for estimating condition.

26. Account 33. Power Line Poles and Fixtures.

The property under this account shall be inventoried by the electrical parties.

The following data will be required:

(*a*) Poles.

If poles are of wood, the variety shall be stated, and how treated, whether peeled, painted, sawed, turned, creosoted, etc. For concrete poles full specifications shall be obtained showing number and size of reinforcing rods, whether solid or hollow, and all dimensions. Similar data must be obtained for iron poles.

Concrete settings of poles shall be noted, as well as any evidence indicating exceptional difficulty in setting. Poles more than 25 feet in height shall be recorded to the nearest 5 feet. All numbers or other marks which would help locate poles shall be recorded.

(*b*) Transmission towers.

It is expected that the carrier's schedule will be accompanied by plans and specifications of all transmission towers. In any event, substantially complete drawings and specifications should be obtained.

(*c*) Overhead structures for supporting trolley wire.

Overhead bracket construction, and bridges for supporting catenary wire, are included under this account. It is expected that the schedule submitted by the carrier will constitute a fairly complete inventory of such property, and will be accompanied by plans and specifications of complicated structures such as overhead bridges.

27. Account 34. Underground Conduits.

The property under this account, including not only conduits required for the wires and cables of electric railway construction, but also all conduits for electric power and lighting wires, shall be inventoried by the electrical parties.

The following data shall be required:

(*a*) General construction details.

Records shall show cross-section sketches of every type of construction in use. The number of linear feet of each construction shall be shown, and location indicated on sketch map of the system. Location of manholes shall be shown in a similar manner.

(*b*) Manholes.

The amount of excavation and masonry in each manhole must be calculated from inside measurements and other available data. Unusual shapes and special equipment of manholes, such as cable racks, barriers, etc., must be shown by sketches. Weights of manhole covers and frames shall be recorded where available.

(*c*) Trenching.

Amounts of excavation required in laying conduit must be estimated from available data. Special care should be exercised to include all work and materials involved in laying drains, sewer connections, and branch conduits.

(*d*) Pavement.

If the conduit is laid under pavement, complete data on material and thickness of same shall be recorded. If practicable, facts shall be ascertained and recorded as to pavement existing at time conduit was laid.

28. Account 37. Roadway Machines.

The register of roadway machines prepared by the carrier shall be verified for major items by the mechanical parties, by actual inspection in the field, and the following data noted:

Kind of machine.

Name of manufacturer.

Date of purchase.

Principal details of design, as outlined under accounts Nos. 44, 45, 51, and 53.

29. Account 44. Shop Machinery.

The inventory shall be made in accordance with the following outline:

(*a*) Shop tools.

The mechanical parties shall inventory all shop tools and obtain complete name-plate data in all cases where available.

(*b*) Shafting and belting.

The length of each size of shafting and the type of shaft hangers and yokes shall be recorded, together with a list of the belts, giving kind, length, and dimensions.

(*c*) Electric motors.

Information required regarding electric motors includes for direct-current motors, voltage, number of poles, whether interpole, shunt, compound, or series, and speed or speeds; and for alternating current motors, voltage, frequency, phases, whether commutating, repulsion, induction, or synchronous, and speed; and for induction motors, whether squirrel-cage or wound rotor. Full name-plate data of starting devices shall be recorded.

(*d*) Wiring and switchboards.

Electric wiring, switchboards, and instruments are to be inventoried as directed for similar equipment of power plants, account 45. All distribution wiring, switches, switchboards, and attachments from the entrance to the building to the apparatus controlling particular machines belong under account 20, Shops and engine houses. Wiring and equipment from and including the first fuse, circuit breaker, or switch controlling a particular machine to and including the machine belong under this account. Notes shall be so taken that this distribution can be made.

(*e*) Engines and boilers.

Engines, boilers, and other power-plant devices are to be inventoried generally as directed for similar apparatus for power plants under account 45.

(*f*) Small tools, jigs, and templets.

The carrier's register of the small tools in use in the shops, such as taps, reamers, dies, chisels, jigs, templets, etc., shall be checked.

(*g*) Foundry tools.

The carrier's register of small tools should include foundry flasks, crucibles, and other portable foundry tools. The registers of shop tools should include large foundry appliances, such as furnaces, molding machines, etc.

(*h*) Foundations.

All data necessary for determining the classified quantities of foundations for machinery shall be obtained.

30. ACCOUNT 45. POWER-PLANT MACHINERY.

Power-plant machinery shall be inventoried by the electrical parties, except where the power plant is entirely nonelectrical, in which case the mechanical parties shall do the work.

The following information will be required:

(*a*) Foundations.

In so far as necessary, foundation data furnished by the carrier shall be checked, and other available information for determining quantities in foundation shall be noted. This will include yardage of excavation and masonry, number and dimensions of piles, and facts as to sheeting, pumping, and other special work involved.

(*b*) Steam-generating plant.

Name of maker and type of boiler.

Nominal horsepower by builder's rating.

Steam pressure carried.

Number, diameter, and length of tubes.

Square feet of heating surface, if available.

Grate or stoker style, and name of maker.

Principal dimensions of stoker or grate.

For horizontal, multitubular boilers, diameter and length.

For water-tube boilers, number and dimensions of all steam and mud drums, and material of headers (cast iron or steel).

Where drawings are not available, prepare sketches showing general arrangement of boilers, including sufficient detail to permit calculation of quantities of materials in boiler settings.

(*c*) Piping.

A schedule of all piping in the plant, grouped by class of service, as high-pressure steam, exhaust steam, feed water, compressed air, etc. This should show what portion of pipes and fittings are covered and kind of covering material, also covering on any other apparatus, as feed-water heaters, flues, etc.

(*d*) Engines.

Manufacturer and type (simple, compound, etc.).

Vertical or horizontal.

Revolutions per minute.

Cylinder dimensions.

Style of valve gear and governor.

Diameter and face of flywheel. If part of generator, so state.

Driven machine. If electric generator, state kilowatts.

If engine was built with an electric generator on the same base plate by one manufacturer, it should be considered as one unit, and full details of both given in the same record.

(*e*) Electric generators.

Make, kilowatts, voltage, direct current or alternating current, frequency, revolutions per minute, number of main poles and interpoles.

(*f*) Turbo-generators.

Steam turbines and electric generators built to operate together shall be treated as single units. The following information is required:

Manufacturer.

Vertical or horizontal.

Rated steam pressure, and whether condensing or noncondensing.

Kilowatts, revolutions per minute, voltage, alternating current or direct current, frequency, number of main poles and interpoles.

(*g*) Auxiliaries.

Verify register of all auxiliaries, such as economizers, feed-water heaters, steam traps, pumps, forced-draft machinery, accumulators, conveyors, etc., and record the principal data of each, including customary or available capacity data.

(*h*) Rotary converters, motor generators, and boosters.

These, if in the power station, come under this account and not under account 45, Power substation apparatus.

Information required includes the manufacturer, kilowatts, voltage, revolutions per minute, frequency, number of main poles and interpoles, whether shunt, series, or compound wound, and any special attachments, as end-play devices, etc.

(*i*) Transformers.

Number, make, kilowatts, number of phases, method of cooling, voltage range, and frequency.

(*j*) Storage batteries.

Make, type and rating, size of plates and number per cell, number of cells, ampere-hour rating, and voltage.

(*k*) Electric-control apparatus

A detailed list is required by panels of all switchboard equipment. This shall give full rating and catalog number, so far as readily obtainable, of every switch, circuit breaker, instrument, etc. Remote control switches should be listed with their panels.

Make sketches, where necessary, of special construction for supporting switchboards, high-tension buss bars, lightning arresters, etc., and for high-tension line exits.

(*l*) Wiring.

Switchboard instrument wiring need not be listed in detail. All other station power wiring must be listed, the number of feet of each kind and size of wire being given.

For each kind and size of wire indicate, so far as readily obtainable, material of wire, size, solid or stranded, kind and thickness of insulation, and any other details affecting price. Also indicate voltage at which wire is used.

(*m*) Gas-engine driven plants.

Gas producing plants used for furnishing gas for power-plant engines shall be listed under this account and not under 25, Gas producing plants.

Gas producers, holders, cleaners, scrubbers, blowers, and other equipment peculiar to gas plants shall be inventoried in the same general manner as prescribed for steam-plant apparatus, recording or checking make, description, size, capacity, age, and full name-plate data in each case.

(*n*) Water-power plants.

This includes only the machinery of such plants. Power dams, canals, and pipe lines come under account 28, and power-plant buildings under account 29. The following information is required:

For water wheels: Make, description, diameter of runners, rated horse power, revolutions per minute, hydraulic head, age and date of manufacture, etc., including full name-plate data.

For water-wheel governors: Make, description, and full name-plate data.

Pipe lines shall be considered to end where the penstocks connect with the first special fitting, valve, or other device at the power house. Piping from that point, including draft tubes, shall be listed and described in detail as part of the power-plant machinery.

31. Account 46. Power-Substation Apparatus.

The inventorying of electrical transforming apparatus, switchboards, blowers, wiring, storage batteries, etc., shall be in accordance with instructions for power-plant machinery. The electrical section will be responsible for this work.

32. ACCOUNT 51. STEAM LOCOMOTIVES.

All steam locomotives shall be inspected by the mechanical section for the purpose of identification, checking information furnished by the carrier, determining condition, and securing other required data.

The following data shall be noted with respect to each steam locomotive.

(*a*) Description.

Builder.
Builder's number.
Date built.
Owner's plate.
Bought of.
Date bought.
Kind of service.
History.
Type (Whyte symbols).
Size of cylinders.
Diameter of drivers over new tires.
Tender, capacity—water, fuel.
Engine truck wheels, kind, diameter.
Driver brakes, kind.
Driving wheel centers, kind, diameter.
Superheater, kind.
Main stem valves, kind.
Valve gear, kind.
Air reservoir, number, size.
Air pumps, number.
Air pumps, simple or compound, size, make.
Air-brake equipment, schedule.
Headlights, number, kind.
Train signal, kind.
Working steam pressure.
Boiler, type.
Boiler, diameter at first ring.
Fire box, type.
Fire box, dimensions.
Combustion chamber.
Flues, number, O. D., length.
Tender, type.
Tender frame, kind.
Tender wheels, number, kind, diameter.
Tender trucks, kind.

(*b*) Additions and betterments.

Verify the carrier's report on additions and betterments in so far as may be practicable in the field.

(*c*) General condition and defects.

Notes on the condition and defects of the following parts of each locomotive and tender shall be made:

Boiler.
Fire box.
Flues.
Cylinders.
Frames.
Wheel centers.
Tire thickness, wear.
Valve motion.
General machinery.
Tender trucks.
Tender underframe.
Tender cistern.

(*d*) General and statistical information.

The following general and statistical information shall be recorded for each locomotive:

Last general repairs, date of.
Mileage since last general repairs.
Total mileage expected from same.
Maintenance, normal, above or below.

(*e*) Service condition per cent.

The service condition per cent which is ascertained for each locomotive as a whole shall be the weighted average of the condition per cents assigned to the following principal parts:

Engine: (1) Boiler, (2) underframe, (3) running gear.
Tender: (1) Trucks, (2) underframe, (3) tank.

33. ACCOUNT 52. OTHER LOCOMOTIVES.

All locomotives of this class shall be inspected for the purpose of identification, checking information furnished by carrier, determining condition, and securing other required data. Electric locomotives shall be inspected and inventoried by the electrical parties and gas and compressed-air locomotives by the mechanical parties.

The following data shall be noted for each locomotive:

Electric locomotives—

(*a*) Description.

Record separately for body, trucks, motors, and control, the following:

Builder, date built, bought of, and date bought.

Also record for each locomotive the following:

Owner's plate.
Kind of service.
History.
Type (Whyte symbols).
Power supply, volts, direct-current, alternating-current, phase.
Power transformer, type.
Motors, manufacturer, type.
Drive, gear, rods, etc.
Method of cooling motors.
Control, manufacturer, type.
Collectors, number, kind.
Air-brake system, schedule.
Air compressor, manufacturer, type.
Air governor, manufacturer, type.
Air reservoirs, number, size.
Heaters, kind.
Trucks, manufacturer, type.
Drive wheels, kind, diameter new.
Trail wheels, kind, diameter new.
Drawbars, kind.

(*b*) General condition and defects.

The general condition and defects of the following parts of each locomotive shall be noted:

Motors.
Wiring.
Controllers.
Contactors.
Reverser.
Resistances.
Transformers.
Compressor.
Brake system.
Trucks.
Wheels.
Body.

(*c*) Service condition per cent.

The service condition per cent which is ascertained for each locomotive as a whole shall be the weighted average of the condition per cents assigned to the following principal parts:

(1) Motors, (2) control, (3) body, (4) trucks.

Gas and compressed-air locomotives:

The same information shall be obtained and recorded for gas and compressed-air locomotives as is above required under the instructions for electric locomotives in so far as same is applicable.

34. ACCOUNT 53. FREIGHT-TRAIN CARS.

Freight-train cars shall be inspected and inventoried in such proportion of each series as may be directed for the purpose of verifying the information contained in the register furnished by the carrier, determining condition, and securing other required data.

Ordinarily not less than 10 per cent of the cars in each series shall be inspected for condition and as many more as may be necessary to furnish a fair basis for an estimate of condition to be applied to the entire series or for making a sufficient check of additions and betterments. As many additional freight-train cars as practicable shall be observed, and the fact of this observation recorded, in order to establish their existence.

The existence of freight-train cars not seen by representatives of the Division of Valuation shall be established from reports of car movements in the records of the

carrier. If no record of such movement within 90 days previous to the date of the investigation can be found, this fact shall be reported.

The following data shall be recorded for each freight-train car inspected:

(*a*) Description.

Builder.
Date built.
Owner's plate.
Bought of.
Date bought.
Kind of car.
History.
Capacity, weight.
Length over end sills.
Width over side sills.
Underframe, kind.
Superstructure, kind.
Center sills, kind.
End sills, kind.
End of car, kind.
Roof, kind.
Doors, side, end.
Platforms (caboose), kind.
Bolsters, body, kind.
Draft timbers, kind.
Draft rigging, kind, manufacturer.
Air-brake equipment schedule.
Trucks, kind.
Truck bolsters, kind.
Wheels, kind, diameter.
Journals, size.
Safety appliances.

(*b*) General conditions and defects.

The general condition and defects of the following parts of each car inspected shall be noted:

Roof.
Body.
Floor.
Underframe.
Trucks.

(*c*) Additions and betterments.

Verify the carrier's report of additions and betterments to the extent practicable in the field.

(*d*) Service condition per cent.

The service condition per cent ascertained for each car inspected, as a whole, shall be the weighted average of the service condition per cents assigned to the following principal parts: (1) Body, (2) underframe, (3) trucks.

The mechanical section shall inspect and inventory freight-train cars, except cars equipped for electrical operation, which shall be inspected and inventoried by the electrical parties. The electrical parties shall also record the additional data called for in the case of passenger-train cars electrically equipped.

35. ACCOUNT 54. PASSENGER-TRAIN CARS.

All accessible passenger-train cars shall be inspected for the purpose of identification, checking information furnished by the carrier, determining condition, and securing other required data. The following data shall be noted for each passenger-train car inspected.

(*a*) Description.

Builder.
Date built.
Owner's plate.
Bought of.
Date bought.
Kind of car.
History.
Capacity, passengers, pounds, weight.
Length over end sills.
Width over side sills.
Body, kind.
Roof, kind.
Underframe, kind.
Body bolsters, kind.
Body crossties, kind.
Air-brake equipment schedule.
Trucks, kind.
Truck bolsters, kind.
Wheels, number, kind, diameter.
Journals, size.

Axle generator, kind, volts.
Batteries, kind, number of cells.
Draft rigging, kind, make.
Platform, kind.
Vestibule, kind.
Partitions, number, kind.
Toilet rooms, number.
Toilet hoppers, number, kind.
Interior finish.
Seats, number, kind.
Upholstering, kind.
Light, kind.
Heat, kind, maker.

(*b*) General condition and defects.

The general condition and defects of the following parts of each car inspected shall be noted:

Exterior of body.
Interior of body.
Underframe.
Draft gear.
Platforms.
Trucks.

(*c*) Additions and betterments.

Verify the carrier's report on additions and betterments in so far as may be practicable in the field.

(*d*) Service condition per cent.

The service condition per cent ascertained for each car inspected, as a whole, shal be the weighted average of the service condition per cents assigned to the following principal parts: (1) Body, (2) underframe, (3) trucks.

(*e*) Cars having motor equipment.

Where cars have motor equipment the following additional information shall be noted:

Length over bumpers.
Air-brake system symbol.
Air compressor, manufacturer, and type.
Air governor, manufacturer, and type.
Draw bars, kind; wheel guards, kind; fenders, kind.

(*f*) Electric trail cars.

Where trail cars are equipped especially for operation in trains with electric motors, instructions in the preceding paragraph will apply.

The mechanical section shall inspect and inventory all cars coming under account 54, except those cars having electric motor equipment, which shall be inspected and inventoried by the electrical parties.

36. Account 55. Motor Equipment of Cars.

All motor equipment of cars shall be inspected for the purpose of identification, checking information furnished by carrier, determining condition, and securing other required data. All cars having electric motor equipment shall be inspected and inventoried by the electrical parties, and cars having other motor equipment, such as gasoline, steam, and compressed air, shall be inspected and inventoried by the mechanical parties.

The following data shall be noted for each car inspected:

(*a*) Electric cars.

Power supply, volts, direct-current, alternating-current, phase.
Motors, manufacturer, type, number.
Control, manufacturer, type.
Collectors, number, kind.
Wiring, type (cable, conduit, etc.).

(*b*) Storage-battery cars.

In addition to the above, note the following data relative to storage batteries:
Manufacturer and type.

Volts, ampere-hour rating.
Plates, size and number per cell.
Number of cells.

(c) Oil-engine electric cars.

So far as applicable the preceding instructions will apply. In addition, however, note the following:

Generator, manufacturer, type, kilowatts, volts, revolutions per minute.
Engine, manufacturer, type.
Cylinders, number, size, stroke.
Fuel, kind.

(d) Oil-engine driven cars.

The preceding instructions will apply in so far as applicable.

(e) Electric trail cars.

Control equipment and wiring on cars having no motors, but equipped for multiple-unit operation with electric motor cars, shall be inventoried under this account.

(f) General condition and defects.

Notes shall be made on the general condition and defects of the following parts of the motor equipment of each car inspected:

Motors.	Engine.
Wiring.	Transmission gear.
Control system.	Battery.

(g) Service condition per cent.

The service condition per cent which shall be ascertained for the motor equipment of each car as a whole shall be the weighted average of the service condition per cents assigned to the principal parts of the car stated above under (f).

37. Account 56. Floating Equipment.

All floating equipment shall be inspected and inventoried by the mechanical section. The electrical section will, however, render such assistance as may be necessary where electrical equipment and devices are found.

The machinery under this account shall be inventoried in accordance with the instructions given under account 45, Power plant machinery.

All floating equipment shall be inspected for the purpose of identification, checking information furnished by carrier, determining condition, and securing other required data. The following data shall be recorded with respect to each piece of equipment:

Kind.	Capacity, tons, passengers, cars, etc.
Service.	Type of propulsion.
Builder.	Principal details of power equipment.
Principal dimensions.	Construction of hull and upper works.

38. Account 57. Work Equipment.

All work equipment shall be inspected.

Work equipment consisting of locomotives, cars, or floating equipment shall be inventoried by the mechanical section in accordance with instructions covering similar equipment under accounts 51–56, inclusive. In case of work equipment consisting of machinery mounted on wheels, such as steam shovels, pile drivers, wrecking cranes, etc., instructions relating to cars shall be followed in so far as applicable, and the remainder shall be inventoried in accordance with instructions for power house and shop machinery.

Electric motor cars used as work equipment shall be inventoried by the electrical parties in accordance with instructions hereinbefore given for similar property.

39. ACCOUNT 58. MISCELLANEOUS EQUIPMENT.

Miscellaneous equipment shall generally be inspected and inventoried by the mechanical section.

(*a*) Horses.

The inspector shall record for each horse its age, color, height, weight, and physical defects.

(*b*) Wagons and automobiles.

Wagons, automobiles, and miscellaneous equipment shall be inventoried. The register filed by the carrier shall be verified by number, kind, make, etc., and the condition of the various items recorded.

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